

## STUDIES IN NEARCTIC DESERT SAND DUNE ORTHOPTERA<sup>1</sup>

Part XIII. A remarkable new genus and species of giant black Sand treader camel cricket from the San Rafael Desert with key and notes.

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One of the rarest and most interesting of the Sand treader camel cricket complex is a large, jet-black creature representing a new genus and species found on certain isolated dunes of the San Rafael Desert, the easternmost of three eremological components of the Great Basin Desert. Very little is known about its habits and less than a dozen specimens have been taken in the past four decades. I have found a few females, unfortunately all dead and dried, lying at the base of small dunes of reddish sand, 19 miles north of Hanksville, Emery County, Utah. Efforts to collect them, in 1970, did not materialize and I look forward to the day when I can study them alive in the field.

The complete fauna of the San Rafael Desert is still inadequately known despite the recent studies of Dr. Wilmer Tanner and associates who have, however, greatly advanced our knowledge of the herpetofauna of this little known desert. Some of the herpetological additions of the past two decades are: the beautiful Golden-headed collared lizard *Crotophytus collaris auriceps* Fitch and Tanner; the Utah chuckawalla *Sauromalus obesus multiforaminatus* Tanner and Avery; the Spotted leopard lizard *Gambelia wislizeni punctatus* Tanner and Banta; the Utah night lizard *Xantusia vigilis utahensis* Tanner, and *Uta stansburiana uniformis* Pack and Tanner just described. Tanner (1958) gave a preliminary list of the herpetofauna which is most imposing and to which many new additions have been made. Among Orthopterans the huge *Trimerotropis agrestis gracewileyae* Tinkham and the black Sand treader, herein described, are only two newly named, but others certainly await discovery. Indications are that the San Rafael Desert will prove to be a most distinctive and interesting eremological component of the Great Basin Desert.

A key to the genera of Sand treaders is here presented to assist the student to correctly diagnose this interesting complex of sand dune Rhaphidophorines and their nearest allies.

### GENERIC KEY TO THE SAND TREADER CAMEL CRICKETS AND THEIR ALLIES

1. Mesotibiae with three to five pairs of dorsal spines or spurs  
(sometimes irregularly placed) exclusive of the calcar ..... 3

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- Mesotibiae with two pairs of dorsal spines (sometimes only three) exclusive of the calcars ..... 2
2. Sand basket present and formed by the crowding together apically of four pairs of long aciculate spurs .....  
..... *Rhachocnemis* Caudell
- Sand basket absent ..... *Ceuthophilus*, *Pristoceuthophilus*,  
*Udeopsylla*, *Styracosceles* and *Phrixocnemis*
3. Sand basket formed by four to six pairs of long, moveable, aciculate spurs, somewhat flattened on their inner faces and crowded apically on the caudal tibiae ..... 5
- Sand basket absent ..... 4
4. Three caudal tarsomeres, their distoventral angles well-rounded ..... *Daihinia* Haldeman
- Four caudal tarsomeres, their distoventral angles strongly acute ..... *Daihinoides* Hebard
5. Size small, external inferior keel of the caudal femora un-toothed; caudal tibiae straight. Ovipositor long, slender, about one-half the body length ..... 8
- Size medium to very large; external inferior keel of caudal femora toothed; the teeth of variable size, sometimes very large, often smaller and uniform. Ovipositor very short to medium in length ..... 6
6. Color pale; size medium to large. Caudal tibiae straight or curved; the external inferior keel of the caudal femora with either a row of uniform teeth or with irregular, huge, spikelike teeth and smaller teeth. Tarsomere ratio 3-4-3 with the distoventral angles acute. Ovipositor short, equal to the length of the pronotum ..... 7
- Color black, size large. Caudal tibiae straight; the external inferior keel of the caudal femora with one to three huge, spikelike teeth widely separated and with several smaller ones. Tarsomere ratio 3-4-3, their distoventral angles lobate. Ovipositor long and slender with six uncinuate teeth apically on the lower valvulae; length of ovipositor about half the body length ..... *Utabaenetes* n.g.
7. Size medium-large; caudal tibiae strongly arched in males. External inferior keels of caudal femora with a row of strong uniform teeth ..... *Macrobaenetes* Tinkham
- Size medium to very large; caudal tibiae straight in both sexes. External inferior keels of the caudal femora with two to four very large, spikelike teeth centrally situated on the keel, preceded and followed by small and medium teeth ..... *Daihinibaenetes* Tinkham

8. Tarsomere ratio 3-4-4 with their distoventral angles well-rounded ..... *Daihiniella* Hubbell  
 Tarsomere ratio 3-4-3 with their distoventral angles spined or acute ..... *Ammobaenctes* Hubbell

*Utabaenctes* Tinkham, n. g.

*Utabaenctes* is distinguished from all other Sand treader camel crickets by its usually jet-black coloration and by the spination of the legs. The huge spikelike teeth on the inferior external keel of the caudal femora, in the male especially, are reminiscent of *Daihini-baenctes gigantea* Tinkham, but in the new genus these spikes are more widely spaced and are preceded as well as followed by three or four small teeth. The tarsomere ratio is distinct and the spination of distoventral lobes of the first three caudal tarsomeres in *Daihini-baenctes* amply separate it from the *Utabaenctes* where they are lobate in the fore and mesotarsi and plain and nonlobate in the metatarsomeres; a diacritical character of value in separating it from all other members of the Sand treader complex. The black coloration, the sand basket, and the characteristics of the metatarsomeres separate the new genus from *Daihinia* and *Daihiniodes*. From the black *Udecopsylla robusta* of the Great Plains which it resembles so closely and to which evident relationship would be expected, the sand basket, the lack of many pairs of ventral spines or spurs on the caudal tibiae, and the tarsomere ratio of 3-4-3 and not 3-4-4 dispel any idea of close relationship. Even the ovipositors, although superficially alike, are when studied quite dissimilar. The curved caudal tibiae and the row of medium-sized and uniform teeth on the external inferior keels of the caudal femora in *Macrobaenctes* quickly separated that genus from the black *Utabaenctes* herein described.

DESCRIPTION.— Body large and heavy and form typical of the Rhaphidophorinae. Fore and middle legs average; hind legs of rather heavy build. The chief diacritical features lie in the spination of the legs. Forelegs in both male and female bearing a strong toothlike projection on the vertical foremargin of the forecoxae; fore femora unspined dorsally; ventrally with one to several minute teeth on the external keel and six to eight or more on internal keel with usually a large subapical spine in the male. Dentition reduced in the female on the external inferior keel and with only the large subapical spine present on the inferior internal keel. Foretibiae unspined dorsally in both sexes except for the apical calcars, the external of which is much the largest and acuminate; ventrally there are four pairs of large acuminate spurs plus long apical calcars. Middle legs without coxal spurs; mesofemora unspined dorsally; ventrally both keels with four to ten teeth in the male, number much reduced in the female. Mesotibiae dorsally with four, sometimes four and one-half, pairs of long acuminate spurs plus apical calcars in both sexes; ventrally with three to four pairs of smaller spurs mostly in the apical half plus a very large pair of acuminate calcars. Mesotarsomeres four,

the distoventral angles of each somewhat weakly lobate. Hindlegs with usually two, sometimes three or four very large spikelike teeth plus one or two small apical teeth on the external inferior keel of the femora in the male; these much reduced in the female. Internal inferior keel of caudal femora in the male with a few small widely spaced teeth; keel entire in female. Caudal tibiae unspined ventrally in both sexes except for one or two small median subapical teeth and a large pair of apical calcars. Dorsal surface of the caudal femora with eight pairs of long aciculate spurs plus the apical calcars in both sexes, five pairs of which are crowded into the apical quarter to form the sand basket, the additional spurs on outer and inner dorsal keels in the basal portions unpaired with one to four minute teeth in the interspaces. Caudal tarsomeres three, the distoventral angle of the first two normal, of segment 3 somewhat acute, this character distinguishing *Utabaenetes* from all the other genera.

Male genitalia with supra-anal plate roundly triangular and strongly deflexed (may be due to preservation in alcohol); cerci very long and sparsely hirsute; subgenital plate with long forcipate arms. Female genitalia with circular supra-anal plate; ovipositor straight with slight recurvature and longer than the pronotum. Dorsal valvulae terminating in an acute spine; ventral valvulae with six uncinate hooks, four of which are crowded apically.

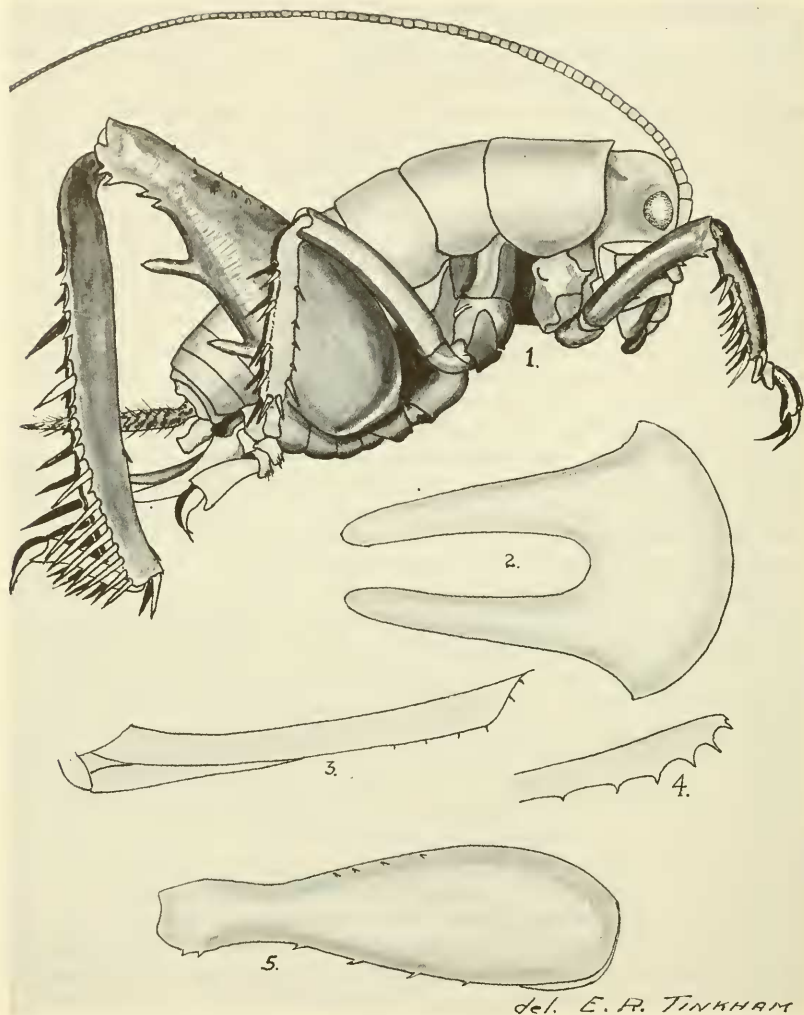
TYPE-SPECIES.— *Utabaenetes tanneri*, new species.

This monotypic new genus and species is named to honor Dr. Vasco M. Tanner and his long, illustrious career as editor and scientist. Dr. Tanner retires in December 1970 as editor of the *Great Basin Naturalist* after 30 years of devoted and meritorious services. During that time he has developed that publication into a highly respected and first-class scientific journal. During 45 years of outstanding leadership at Brigham Young University—38 of those years as the chairman of the Department of Zoology and Entomology—he has developed that department into a widely recognized institution and has shaped the lives of numerous younger scientists who have been fortunate enough to study under his kindly tutelage. In the field of entomology he has become a well-known authority on the Curculionidae and Tenebrionidae. In the zoological realm he has published papers on the fish, amphibians, and reptiles, particularly of the Great Basin Desert.

*Utabaenetes tanneri*, n. sp.

DESCRIPTION.— Male: body jet black, form large and typical of this group of the Rhabdiphorinae. Head almost as broad as deep; fore margin of the pronotum very slightly emarginated; palpi with terminal segments bulbous.

Leg spination as follows: fore legs with the vertical coxal margin bearing a large toothlike projection; forefemora unarmed dorsally, ventrally with the external inferior keel bearing four to five small teeth, the internal keel with four to five very minute teeth plus a larger subapical tooth. Foretibiae unspined dorsally, ventrally with



Figs. 1-5. *Utahaenetes tanneri* Tinkham: 1. Male holotype enlarged six times and reduced one-half; 2. Ventral view of subgenital plate of male paratype; 3. Ovipositor of female allotype; 4. Apical view of ventral valvulae of female allotype; 5. External view of right caudal femora of female allotype.

three to four pairs of long tapering spurs plus the apical calcars, those externally twice the size of the internal ones. Foretarsi short, the first two segments extremely short, the third three times the combined length of 1 and 2; and distoventral angles of all three lobate. Middle legs with mesocoxal carinae unarmed; mesofemora unspined dorsally; ventrally with three to four teeth on each keel and sometimes a tooth on the lower genicular lobes. Mesotibiae with

four pairs of long, tapering acute spurs dorsally plus similar apical calcars; ventrally with three pairs of much smaller acuminate spurs plus a very large pair of apical calcars. Mesotarsi 4-segmented, the first three segments equal in length to the fourth; tarsomeres 2 and 3 very short; the distoventral angles of 2 and 3 quite lobate, of 1 angular and of 4 acutely lobate. Hind legs rather heavy with caudal femora dorsally with a row of widely spaced minute teeth on the internal dorsal ridge plus other scattered teeth nearby; ventrally with the external inferior keel bearing one to two high spikelike teeth in the apical half plus much smaller teeth basad and apicad of these and with twin teeth on the basal portions of the genicular lobes; internal inferior keel with five to seven small teeth scattered along its length plus a larger twin pair on the base of the genicular lobe. Caudal tibiae dorsally with one to three small, median, sub-apical appressed teeth plus a pair of calcars; ventrally with eight pairs of long acuminate spurs, six pairs of which are crowded into the apical third to form the sand basket. External inferior keel with spur 1 in the basal third preceded by three to four small teeth, spur 2 separated from spur 1 by four to five small teeth; spur 2 separated from the six spurs of the sand basket by one small tooth. Internal inferior keel with spur 1 in the basal quarter preceded by one to two small teeth and with three small teeth between spurs 1 and 2 which is medianly placed with one small tooth separating spur 2 from the rest of the sand basket. Caudal tarsi 3-segmented, segments 1 and 3 equal in length, segment 2 very short; the distroventral angles in all three barely lobate, a distinctive feature of *Utabaenetes*.

Genitalia with supra-anal plate triangular with broadly rounded apex which is strongly deflexed; cerci long and tapering, sparsely hirsute. Pseudosclerite broadly triangular, the ventral surface deeply excavate, the dorsal surface flat with strongly reflexed semicircular apical lip. Subgenital plate large with very long forcipate arms.

**FEMALE.**— Closely similar to the holotype in size. Leg spination as follows: procoxal spine smaller; forefemora untoothed dorsally; ventrally as in the male. Foretibiae as in the male except that the internal inferior keel has one additional small spine. Foretarsi as in the male. Middle legs as in the holotype. Hind legs with caudal femora dorsally as in the male; ventrally with the dentition on the external inferior keel greatly reduced in size with five widely spaced small teeth in the apical two-thirds plus twin pairs of small teeth on the basal portions of the genicular lobes; internal inferior keel untoothed except for one to two teeth on the lower genicular lobes. Caudal tibiae and tarsi as in the holotype.

Genitalia with the supra-anal plate small and circular in outline with bevelled margin and central basal depression. Cerci long, tapering, hirsute. Subgenital plate, shallowly transverse with the margin gently convex. Ovipositor long, about half the body length; dorsal valvulae terminating in an acute apex; ventral valvulae with six uncinuate hooks, four of which are crowded apically.

**TYPE MATERIAL.**— Male holotype: Hanksville, Wayne County, San Rafael Desert, April 20, 1928, W. J. Gertsch. Calliper measure-

ments in millimeters: body length 18.5; pronotum 4.9; caudal femora 15.6x4.0; caudal tibiae 12.5. Holotype deposited in the Museum of Zoology of the University of Michigan.

Female allotype: Calliper measurements in millimeters; body length 18.6, pronotum 5.3, caudal femora 14.8, caudal tibiae 11.2; ovipositor 11.8. Female allotype deposited in the Museum of Zoology, University of Michigan.

Male paratypes: Two with same data as holotype. One from Willow Springs, Escalante Desert, Kane County, Utah, June 1936, Department of Entomology, Brigham Young University. Measurements in millimeters: body length 17.9-20.5; pronotum 4.8-5.2; caudal femora 15.1-16.1; caudal tibiae 12.5-15.1. Male paratypes deposited in the Tinkham Eremological Collection and the Department of Entomology of Brigham Young University.

Paratypes from the holotype locality are closely similar to holotype in every respect although one male is tan in coloration and may be somewhat teneral. The Willow Tank male paratype has the dentition on the external and internal inferior keels more numerous on all femora. Dentition on all tibiae quite similar to the holotype.

Female paratypes: one with same data as the allotype. Three collected dead and dried at base of small pale-reddish dunes, 19 miles north of Hanksville, Aug. 8, 1958, Ernest R. Tinkham. Calliper measurements in millimeters: body length 17.0-18.5; pronotum 4.8-5.2; caudal femora 13.9-14.8; caudal tibiae 10.7-11.5; ovipositor 10.8-11.7. Female paratypes deposited in the Tinkham Eremological Collection and the Department of Entomology at Brigham Young University.

Female paratypes similar to the allotype in every respect.

Biology: nothing is known about these. It is not known whether the nymphs are pale tan in coloration, becoming black after maturation and exposure to increasing heat as the temperature increases in the spring. In a conversation with Dr. Willis J. Gertsch, authority on spiders, on September 13, 1970, at his home in Portal, Arizona, I was informed that one pair were mating about midnight of April 20, 1928, but after the lapse of 42 years no particulars were remembered. Efforts to find the creature in late July 1970 did not materialize. The lateness and dryness of the season are suspected to have been the reason to find no living material.

Orthopteran associates: In 1958, the author found the only Orthopteran associates on the Hanksville dunes, 19 miles north of Hanksville, were the huge *Trimerotropis agrestis graccwileyae* Tinkham, the rare *Trimerotropis salina*, and at night the handsome *Plagiostira gilletti* and an undescribed species of *Ammobaenetes*.

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